REMARKS

Claims 1-24 are pending in the present application. Claims 1-24 have been rejected. New Claims 25-27 have been added. Claims 1-24 and the specification have been amended. Support for these amendments herein presented can be found in the specification and claims as filed. No new matter has been introduced by these amendments. Reconsideration and allowance is respectfully requested in view of the amendments and the following remarks.

Examiner's Objection

Claims 1-12 have been objected to because of informalities. The Applicant has amended the claims to correct any informalities. Reconsideration and withdrawal of this objection is respectfully requested.

The § 103 Rejection

Claims 1-24 stand rejected under 35 USC § 103(a) as being unpatentable over Wenzel et al. (US Patent No. 4,083,698) in view of Nixon (U.S. Patent No. 3,615,290) and Jahnke (U.S. Patent No. 5,920,031). Applicant respectfully disagrees with the Examiner's assertions.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, must contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art must have had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

Wenzel, et al. teaches a fuel composition, preferably for use in internal combustion engines, comprising a water-in-oil emulsion of (a) a hydrocarbon fuel, such as gasoline, diesel fuel or fuel oil; (b) water; (c) preferably a water-soluble alcohol; and (d) a novel combination of surface-active agents to provide a clear composition which is stable against phase separation over a wide range of temperatures. (Abstract) Wenzel, et al. also teaches that when the ammonium and sodium salts of oleic acid were used without the condensation products, a stable fuel composition containing water, a water-soluble alcohol, and a mixture of hydrocarbons could not be obtained. Phase separation occurred on cooling the fuel composition below the freezing point of water. It was also found that, if the condensation products were used without the ammonium and/or mixture of ammonium and sodium salts of a long-chain fatty acid, a stable, clear, single-phase liquid containing water, a water-soluble alcohol, and mixture of hydrocarbons could not even be formed at room temperature, that is, phase separation into two phases always occurred. But, when Wenzel et al. used a combination of the ammonium and/or mixture of ammonium and sodium salts of the long-chain fatty acids and a condensation product according to the invention, liquid fuel compositions, stable and clear above and below the freezing point of water, were obtained from the addition of this combination of surface-active agents to the mixture of water, a water-soluble alcohol, and the mixture of hydrocarbons. (Col. 5, lines 6-26) Further, Wenzel et al. teaches the formation of microemulsion. (Col. 3, lines 43-48)

Nixon teaches stable emulsions of normal liquid hydrocarbon fuels particularly jet gas turbine fuels for aircraft, in which the normally liquid hydrocarbon fuel is emulsified with a minor amount of a polar organic liquid which is immiscible with the normally liquid hydrocarbon fuel. (Abstract) Further, one skilled in the art when consulting the Nixon reference understands that Nixon teaches the formation of macroemulsion.

Jahnke teaches water-in-oil emulsions which are useful as explosives. These emulsions comprise: a discontinuous aqueous phase comprising at least one oxygen-supplying component; a continuous organic phase comprising at least one carbonaceous

fuel; and a minor emulsifying amount of at least one emulsifier. The emulsifier is the product made by the reaction of component (A) with component (B), component (A) being at least one substituted succinic acylating agent, said substituted succinic acylating agent consisting of substituent groups and succinic groups wherein the substituent groups are derived from a polyalkene, said acylating agents being characterized by the presence within their structure of an average of at least 1.3 succinic groups for each equivalent weight of substituent groups, and component (B) being ammonia and/or at least one mono-amine. (Abstract) Further, one skilled in the art when consulting the Jahnke reference understands that Jahnke teaches the formation of macroemulsion.

First, Wenzel et al. requires the presence of the condensation products as disclosed in order for a stable fuel composition to be formed. As stated in Wenzel et al.:

> It was discovered that, when the ammonium and sodium salts of oleic acid were used without the condensation products, a stable fuel composition containing water, a water-soluble alcohol, and a mixture of hydrocarbons could not be obtained. It was also found that, if the condensation products were used without the ammonium and/or mixture of ammonium and sodium salts of a long-chain fatty acid, a stable, clear, single-phase liquid containing water, a water-soluble alcohol, and mixture of hydrocarbons could not even be formed at room temperature, that is, phase separation into two phases always occurred. [Col. 5, lines 6-19]

The omission of an element and retention of its function is an indicia of unobviousness. *In re Edge*, 359 F.2d 896, 149 USPQ 556 (CCPA 1966). The Wenzel et al. reference requires the presence of the condensation products in order to achieve a stable fuel composition. The present application does not claim the condensation products of the Wenzel et al. invention, and yet still produces a stable fuel emulsion by using emulsifying agents that coat the particles of the dispersed phase and prevents coagulation of colloidal particles. In the case of the present application, a "hydrocarbonaceous middle distillate fuel additive" that includes "...water, ammonia

hydroxide, a polyanhydride, and a mixture of fatty acids" is claimed. Therefore, the claims of the present application are not obvious. The Wenzel et al. reference cannot be used as a reference against the present application. The Examiner has failed to make a *prima facie* case of obviousness.

Second, Wenzel et al. does not teach each and every element of the claimed invention. Wenzel et al. does not teach that the hydrocaronaceous middle distillate fuel additive includes water and a polyanhydride. Neither Nixon nor Jahnke remedy this deficiency. The Examiner contends that it would be obvious to the artisan in the art to add the ammonium salt of polyisobutene succinic of the secondary references (Nixon and Jahnke) to the composition and the method of the primary reference (Wenzel et al.) with the reasonable expectation that it will provide the same emulsifying and anti-corrosion properties to the water in oil or oil in water as the mixture of ammonium hydroxide and alkenyl substituted succinic anhydride. The Examiner further contends that the said mixture of ammonium hydroxide and alkenyl substituted succinic anhydride inherently will produce ammonium alkyl succinic anhydride, the same additive of the instant claims. The Applicant disagrees.

A simple mixture of ammonium hydroxide and alkenyl substituted succinic anhydride, as proposed by the Examiner, does not necessarily produce ammonium alkyl succinic anhydride. Generally, in order to produce ammonium alkyl succinic anhydride using these compounds, a high pressure and high temperature reaction is required. The polyanhydride of the claims can be polyalkenyl succinic anhydride and polyalkenyl succinic anhydride is created by the chemical process of polymerixation. Polyalkenyl succinic anhydride is not ammonium alkyl succinic anhydride. Wenzel et al. does not teach all of the elements of the present invention, specifically the hydrocaronaceous middle distillate fuel additive having water and a polyanhydride. Neither Nixon nor Jahnke teach as claimed, nor do either reference remedy the deficiency of Wenzel et al. Therefore, the Examiner has failed to make a *prima facie* case of obviousness.

Lastly, there is no motivation to combine the Wenzel et al. reference with the

Nixon and Jahnke references. To establish a *prima facie* case of obviousness, "there must be some teaching, suggestion or motivation in the prior art to make the specific combination that was made by the applicant." *In re Dance,* 160 F. 3d 1339, 1343, 48 USPQ2d 1635, 1637 (Fed. Cir. 1998). In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed. *In re Rouffet,* 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1458 (Fed.Cir. 1998).

One skilled in the art would not look to either Nixon or Jahnke to select elements to combine with Wenzel et al. Wenzel et al. teaches a microemulsion, while Nixon and Jahnke teach a macroemulsion. Microemulsions are isotropic dispersions of oil and water that is thermodynamically stabilized by the presence of surfactant molecules at the interface. The droplet size in water continuous or oil continuous microemulsions ranges from 50 to 1,000 Å. Microemulsions require a large amount of surfactants to stabilize the small droplets. A macroemulsion has larger particle sizes and is characterized as being cloudy. Macroemulsions require a small amount of surfactants to stabilize and are generally thermodynamically unstable. These two types of emulsions are fundamentally different and one skilled in the art would not look to the art teaching microemulsions when creating macroemulsions. Therefore, one would not be motivated to seek out prior art that teaches macroemulsions (as in Nixon and Jahnke) to combine with a prior art reference that teaches microemulsions (as in Wenzel et al.). Therefore, the Examiner has failed to make a *prima facie* case of obviousness.

Thus, Claims 1 and 15 are non-obvious. If an independent claim is non-obvious under 35 U.S.C. 103, then any claim depending therefrom is non-obvious. *In re Fine*, 837 F.2d 1071, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Therefore, Claims 2-14 and 16-27 depending from non-obvious independent Claims 1 and 15, are then also non-obvious. Applicant respectfully requests withdrawal of this rejection and reconsideration.

In view of the foregoing, consideration and an early allowance of this application are earnestly solicited.

Respectfully submitted,
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VERSION WITH MARKED-UP CHANGES:

In the Specification:

Please amend the following paragraphs as follows:

Page 3, line 21 to Page 4, line 8:

This can more easily be achieved by established countries with mature economies, growing nations and their respective governments, than poorer or developing nations whose economies and manufacturing bases, often lack sufficient financial resources, to afford the extremely costly intensive long term testing, research, implementation and compliance controls needed to effect and improve pollution reduction measures for internal combustion engines. [for the]The costs of controlling or limiting air pollution can severely curtail or damage a developing economy if prematurely imposed upon its industries whose well-being upon which the developing nation relies for continued economic well-being. The developing nation will either (1) have to rely upon and become dependent upon those devices and implements developed by established countries whose economies give them the financial wherewithal to indulge wide spread pollution control (2) prematurely impose upon that growing countries industrial base pollution control implementation, as required by many international treaties, that could cripple the country's economy, (3) seek and implement less costly and easily implemented pollution control technologies rather than those devices which are engineered for incorporation within the internal combustion engine and its subsystems.

Page 7, lines 13-17:

The invention is a [novel]water-in-oil emulsion fuel substitute for hydrocarbonaceous middle distillate fuels. The invention is comprised of a hydrocarbonaceous middle distillate fuel, water, and an additive comprising water, a

mixture of fatty acids, polyanhydride, and ammonium hydroxide. Additionally, other fuel quality enhancing agents can also be added to the emulsion fuel as required.

Page 9, lines 4-23:

The invention combines water with the hydrocarbonaceous middle distillate fuel to form a water-in-oil emulsion fuel that can be substituted for the middle distillate fuel combustion applications. Prior to combining the water with the middle distillate fuel, the water [itself]is filtered through reverse osmosis, or other suitable filtration means, to remove particulate and sediment contaminants that are naturally found in various degrees in water depending on its source. These contaminants need to be removed from the water to a satisfactory degree otherwise [they]the contaminants will form deposits/build-ups on the internal workings of the devices that combust middle distillate fuels, as[and] well as present themselves as unacceptable pollutant emissions in the combustion exhaust.

The filtered water is added to the hydrocarbonaceous middle distillate fuel along with [the]an additional additive[s] of water, ammonia hydroxide, a fatty acid mixture and a polyanhydride. The preferred fatty acid mixture is technical grade oleic acid available from Ashland Chemical Company 2788 Glendale Milford Road, Cincinnati, Ohio USA under the name 213 OLEIC ACID TECHNICAL. The preferred polyanhydride is polyisobutylene succinic anhydride which can be procured from Chevron Oronite Company, under the Chevron Oronite LLC.'s label OLOA 371 or OLOA 213. OLOA 371 and OLOA 213 products are differentiated only on the basis that one label represents the paste form of the isobutylene succinic anhydride while the other label represents the liquid form of isobutylene succinic anhydride. Both forms of OLOA product can be used satisfactorily as components. A preferred polyanhydride is polyakenyl succinic anhydride.

Page 10, lines 9-20:

The mixture ratio of the components of the [invention]water-in-oil emulsion fuel is by weight percentage. The weight percentage of the hydrocarbonaceous middle distillate fuel to the [invention]water-in-oil emulsion fuel is [a range of]about 81% to about 99.5%. The weight percentage of middle distillate fuel emulsification additive to the [invention]water-in-oil emulsion fuel is about 0.5% to about 19.0%, preferably about 0.5% to about 5%. The weight percentage of water to the water-in-oil emulsion fuel is about 0.0% to about 18.5%.

The mixture ratio of the components of the middle distillate fuel emulsification additive is by weight percentage. The weight percentage of water to the middle distillate fuel emulsification additive is [a range of]about 0.0% to about 25.0%. The weight percentage of ammonium hydroxide to middle distillate fuel emulsification additive is [a range of]about 15.0%[-]to about 20.0%. The weight percentage of a mixture of fatty acids to middle distillate fuel emulsification additive is [a range of]about 60%[-]to about 70%. The weight percent of polyanhydride to the middle distillate fuel emulsification additive is [a range]about 3.0% to about 10.0%.

In the Claims:

Please amend Claims 1-24 as follows:

1. (Amended) A [novel]water-in-oil emulsion fuel comprising [of the components]: a first amount of water; [A)]a hydrocarbonaceous middle distillate fuel[,]; and [B)]a hydrocarbonaceous middle distillate fuel additive [comprised]including a second amount of water, ammonia hydroxide, a polyanhydride, and a mixture of fatty acids.

2. (Amended) The [A novel]water-in-oil emulsion fuel [as recited in]of claim 1, wherein said hydrocarbonaceous middle distillate fuel [constitutes by

percentage]is about 81% to about 99.5% by weight of the [novel]water-in-oil emulsion fuel[of a range from 95.0% to 81.0%].

3. (Amended) The [A novel]water-in-oil emulsion fuel [as recited in]of claim 1, wherein said hydrocarbonaceous middle distillate fuel additive [constitutes by percentage] is about 0.5% to about 5% by weight of the [novel] water-in-oil emulsion fuel[of a range from 5.0% to 19.0%].

4. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 1, wherein said second amount of water [constitutes a percentage]is about 0% to about 25% by weight of the hydrocarbonaceous middle distillate fuel additive[of a range from 0.0% to 25.0%].

5. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 1, wherein said [has] first amount of water has had [from which]particulate impurities [have been]removed[from it].

6. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 5, wherein said particulate impurities are removed from [the]said first amount of water through [the]a process of reverse osmosis.

7. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 1, wherein said ammonia hydroxide [constitutes a percentage]is about 15% to about 20% by weight of the hydrocarbonaceous middle distillate fuel additive[of a range from 10.0% to 20.0%].

8. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 1, wherein said mixture of fatty acids [constitutes a percentage of]is about 60% to about 70% by weight of the hydrocarbonaceous middle distillate fuel additive additive[of a range from 0.3% to 10.0%].

9. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 1, wherein said polyanhydride [constitutes a percentage]is about 3% to about 10% by weight of the hydrocarbonaceous middle distillate fuel additive[from a range from 3.0% to 10.0%].

10. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim [1]9, wherein said polyanhydride is a polyalkenyl succinic anhydride.

11. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 10, wherein said alkenyl group of [the]said polyalkenyl succinic anhydride is a butylene compound.

12. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 11, wherein said butylene compound is isobutylene.

13. (Amended) In a combustion process wherein a water-in-oil emulsion fuel is subjected to combustion in the presence of air within a combustion chamber of a compression ignition diesel engine, a method of reducing [the] levels of Nitrogen Oxides [(Nox)] in the resultant exhaust gases of the diesel engine which comprises supplying to and burning in said combustion chamber of [novel]the water-in-oil emulsion fuel as claimed in claim 1.

14. (Amended) The [A novel] water-in-oil emulsion fuel [as recited in]of claim 1, [in which the]wherein said hydrocarbonaceous middle distillate fuel further comprises at least one [element]component selected from the group comprising [of] dispersants, corrosion inhibitors, antioxidants, anti-rust agents, detergents, and lubricity agents.

15. (Amended) A method for reducing nitrogen oxide emissions from a compression ignition diesel engine [wherein]comprising: combining a first amount of water, a hydrocarbonaceous middle distillate fuel, [is combined with] and a hydrocarbonaceous middle distillate fuel additive [comprised]comprising i) a second amount of water, ii) ammonia hydroxide, iii) a polyanhydride, and iv) a mixture of fatty acids to form a water-in-emulsion fuel; and combusting said water-in-emulsion fuel [which is then subjected to combustion] in the presence of air within [the]a combustion chamber of said compression ignition diesel engine.

16. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 15, wherein said hydrocarbonaceous middle distillate fuel [constitutes by percentage]is about 81% to about 99.5% by weight of the [novel]water-in-oil emulsion fuel[of a range from 95.0% to 81.0%].

17. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 15, wherein said second amount of water [constitutes a percentage]is about 0% to about 25% by weight of the hydrocarbonaceous middle distillate fuel additive[of a range from 0.0% to 25.0%].

18. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 15, wherein said

first amount of water has had [at least a portion of] particulate impurities [present in said water] removed [from said water].

19. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim [15]18, wherein said particulate impurities are removed [from the said water through the]by a process of reverse osmosis.

20. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 15, wherein said ammonia hydroxide [constitutes a percentage]is about 15% to about 20% by weight of the hydrocarbonaceous middle distillate fuel additive[of a range from 10.0% to 20.0%].

21. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 15, wherein said mixture of fatty acids [constitutes a percentage of]is about 60% to about 70% by weight of the [diesel] hydrocarbonaceous middle distillate fuel additive[of a range from 0.3% to 0.10.0%].

22. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 15, wherein said polyanhydride [constitutes a percentage] is about 3% to about 10% by weight of the hydrocarbonaceous middle distillate fuel additive [from a range of 3.0% to 10.0%].

23. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 22, wherein the polyanhydride is polyisobutylene succinic anhydride.

24. (Amended) The [A] method [for reducing nitrogen oxide emissions from a compression ignition diesel engine recited in] of claim 15, wherein [the hydrocarbonaceous middle distillate fuel is additionally combined with]at least one component selected from the group comprising [of] dispersants, corrosion inhibitors, antioxidants, anti-rust agents, detergents, and lubricity agents is added to said hydrocarbonaceous middle distillate fuel.